What is claimed is:

- 1. A synthetic molecule that specifically interacts with a Toll-like receptor.
- 2. A molecule according to claim 1 that is a molecule selected from the group consisting of a peptide and a peptidomimetic molecule.
- 3. A molecule according to claim 3 wherein the molecule is a peptide that comprises an amino acid sequence of any one of Seq Id Nos. 1-73.
- 4. A molecule according to claim 1 wherein the peptide comprises an amino acid sequence that is at least about 70% identical to any one of Seq Id Nos. 1-73.
- 5. An expression vector that comprises a nucleic acid molecule encoding a synthetic peptide that specifically interacts with a Toll-like receptor.
- 6. A composition comprising an effective amount of molecule according to claim

 1 or an expression vector according to claim 5 and a physiologically acceptable carrier.
- 7. A method of treating a disease selected from the group consisting of cancer or an immune-mediated pathogenic infection, comprising administering to a subject in need thereof an effective amount of a composition according to claim 6.
- 8. A method according to claim 7 wherein the disease is a cancer selected from the group consisting of melanoma, leukemia, lymphoma, a solid tumor (lung, liver, kidney, brain, bladder), retinoblastoma, sarcoma, and a connective tissue cancer.
- 9. A method according to claim 8 wherein the cancer is selected from the group consisting of a lung cancer, a liver cancer, a kidney cancer, a brain cancer, and a bladder cancer.
- 10. A method according to claim 7 wherein the disease is an immune mediated pathogenic infection selected from the group consisting of tuberculosis, leprosis, a bacterial infection caused by a of Gram positive microorganism, a bacterial infection caused by a of Gram negative microorganism, HIV

- infection, Epstein BarrVirus infection, Cytomegalovirus infection, an infection caused by a protozoa, and Leishmania.
- 11. A method of modulating an immune response in a subject, comprising administering to the subject an effective amount of a composition according to claim 6.
- 12. A method according to claim 11 wherein the composition comprises an expression vector that comprises a nucleic acid molecule encoding a synthetic peptide that specifically interacts with a Toll-like receptor.
- 13. A method according to claim 11 wherein the molecule that specifically interacts with a Toll-like receptor is selected from the group consisting of a peptide and a peptidomimetic molecule.
- 14. A method according to claim 11 wherein the molecule that specifically interacts with a Toll-like receptor is a peptide that comprises an amino acid sequence selected from the group consisting of Seq Id Nos. 1-73.
- 15. A method according to claim 11 wherein the molecule that specifically interacts with a Toll-like receptor is a peptide that comprises an amino acid sequence that is at least about 70% identical to any one of Seq Id Nos. 1-73.
- 16. A method according to claim 11 wherein the modulation comprises upregulation of a pro-inflammatory or TH1 response.
- 17. A method according to claim 11 wherein the modulation comprises down-regulation a regulatory or TH2 response.